

CM

We claim:

1. Apparatus for supporting a rock formation comprising,

an elongated member having a base portion with a length substantially greater than a width defining longitudinal edges forming a channel therebetween,

said base portion having a bearing surface for contacting the rock formation and an opposite surface, means for reinforcing said elongated member extending the length of said base portion and positioned centrally on said opposite surface within said channel,

at least one opening extending through said means for reinforcing said elongated member,

a bearing plate including a contact surface and an outer surface, said contact surface positioned in overlying abutting relation with said elongated member opposite surface,

a circular embossed area extending outwardly from said plate outer surface and defining a recessed portion having a bottom wall with a central opening therethrough,

said recessed portion bottom wall positioned in said opening in said elongated plate and positioned adjacent to said means for reinforcing said elongated member to restrain longitudinal movement of said plate on said elongated member,

said plate central opening aligned with said elongated member opening,

a longitudinal embossed area extending outwardly from said opposite sides of said circular embossed area of said bearing plate into overlying relation with said means for reinforcing said elongated member,

said longitudinal embossed area projecting from said plate outer surface in a configuration complementary with the configuration of said means for reinforcing said elongated member,

said plate longitudinal embossed area engaged to said means for reinforcing said elongated member to restrain lateral movement of said plate on said elongated member to stationarily position said plate on said elongated member, and

anchor means extending through said aligned openings into the rock formation and bearing against said plate recessed portion for urging said elongated member into compressive engagement with the rock formation to support the rock formation.

2. Apparatus for supporting a rock formation as set forth in claim 1 in which,

said means for reinforcing said elongated member includes a central rib embossed on said base portion opposite surface, and

said central rib extending the length of said channel member with a plurality of openings extending through said rib and spaced a preselected distance apart on said rib.

3. Apparatus for supporting a rock formation as set forth in claim 2 in which,

said openings in said central rib each have the configuration of a slot with a width equal to the width of said central rib and extending a preselected length along said central rib.

4. Apparatus for supporting a rock formation as set forth in claim 1 in which,

said opening in said means for reinforcing said elongated members is defined by opposite longitudinal side edges positioned in the plane of said opposite surface and opposite transverse abutment walls extending upwardly from said opposite surface.

5. Apparatus for supporting a rock formation as set forth in claim 4 in which,
said bearing plate recessed portion is positioned in said elongated member opening with said bearing plate bottom wall positioned oppositely of said abutment walls to restrain longitudinal movement of said bearing plate on said elongated member.
6. Apparatus for supporting a rock formation as set forth in claim 1 in which,
said bearing plate contact surface extends from said circular embossed area into overlying relation with said means for reinforcing said elongated member and said opposite surface of said elongated member base portion around said opening.
7. Apparatus for supporting a rock formation as set forth in claim 1 in which,
said means for reinforcing said elongated member includes a rib extending longitudinally and positioned centrally on said base portion, and said rib including a pair of web sections connected at one end to each other and angularly disposed relative to one another and connected at an opposite end to said base portion.
8. Apparatus for supporting a rock formation as set forth in claim 7 in which,
said bearing plate longitudinal embossed area extends from diametrically opposed sides of said circular embossed area, and
said longitudinal embossed area has a configuration complementary with the configuration of said rib to overlie said rib to restrain said bearing plate from moving laterally on said elongated member.
9. Apparatus for supporting a rock formation as set forth in claim 1 which includes,
means for restraining lateral movement of said bearing plate on said elongated member.
10. Apparatus for supporting a rock formation as set forth in claim 9 in which,
said means for restraining lateral movement of said bearing plate includes said elongated member having longitudinal edge portions with flanges extending angularly from said base portion, and
said bearing plate including longitudinal edge portions with flanges extending angularly from said outer surface into overlying abutting relation with said elongated member flanges.
11. Apparatus as set forth in claim 10 in which,
said elongated member and said bearing plate have complementary transverse profiles positioned in overlying abutting relation to form a composite channel assembly.
12. A bearing plate comprising,
a planar body portion having a longitudinal axis defining planar longitudinal edges and planar transverse edges,
a contact surface for engaging a generally planar surface on one side of said body portion and an outer surface on an opposite side of said body portion,
an embossed area extending outwardly from said body portion outer surface,
said embossed area including a circular embossment centered on said body portion and a longitudinal embossment extending outwardly from opposite sides of said circular embossment on said longitudinal axis,
said circular and longitudinal embossments centrally and longitudinally rigidify said body portion to resist deflection,
said circular embossment including a recessed portion having a bottom wall with a central opening therethrough, and
said longitudinal edges extending angularly from said body portion outer surface to form flanges for stiffening said longitudinal edges to resist bending.

13. A bearing plate as set forth in claim 12 in which, said longitudinal embossment has a V-shaped configuration extending from said circular embossment the length of said body portion on said longitudinal axis.
14. A bearing plate as set forth in claim 12 in which, said longitudinal embossment includes a reinforcing rib extending centrally on said body portion, said reinforcing rib including a pair of web sections angularly disposed relative to one another, and said web sections being connected at one end to each other and connected at an opposite end to said base portion.
15. A bearing plate as set forth in claim 12 which includes, channel portions on said body portion outer surface between said circular and longitudinal embossments and said flanges on said longitudinal edges.
16. A bearing plate as set forth in claim 12 in which, said flanges extend angularly from said outer surface at an angle to a height of about the height of said circular embossment from said outer surface, and said flanges form with said circular and longitudinal embossment channel portions on said body portion outer surface.
17. A method for supporting a rock formation comprising the steps of,
positioning an elongated channel member in contact with a planar surface of a rock formation,
reinforcing the channel member with a longitudinal embossment extending the length of the channel member,
positioning openings in the channel member in spaced relation along the length of the embossment,
positioning a bearing plate having a contact surface in overlying abutting relation with the channel member around each opening therethrough,
positioning a recessed portion of the bearing plate within the opening of the channel member so that
an opening in the bearing plate is aligned with the opening in the channel member,
restraining longitudinal movement of the bearing plate on the channel member,
restraining lateral movement of the bearing plate on the channel member, and
extending an anchor bolt through the aligned openings in the bearing plate and the channel member into engagement with the rock formation to compress the bearing plate against the channel member to maintain the channel member in bearing contact with the surface of the rock formation.
18. A method as set forth in claim 17 which includes, extending a longitudinal embossment of the bearing plate in overlying abutting relation with the longitudinal embossment of the channel member.
19. A method as set forth in claim 17 which includes, extending longitudinal edges of the channel member angularly and downwardly from the surface of the rock formation, and
extending longitudinal edges of the bearing plate into overlying abutting relation with the channel member longitudinal edges.
20. A method as set forth in claim 17 which includes, positioning the recessed portion of the bearing plate within an elongated slot of the channel member to restrain longitudinal movement of the bearing plate beyond the slot, and
extending the bearing plate contact surface into overlying abutting relation with the surface of the channel member around the slot to reinforce the channel member around the slot.

I

21. An apparatus for supporting a rock formation comprising:

an elongated member having a base portion with a length substantially greater than a width defining longitudinal edges forming a channel therebetween, said base portion having a bearing surface for contacting the rock formation and an opposite surface;

a central rib defined on said base portion opposite surface extending the length of said base portion and positioned centrally on said opposite surface within said channel, and at least one opening extending through said rib;

a bearing plate including a contact surface and an outer surface, said contact surface positioned in abutting relation with said elongated member opposite surface, said

I

bearing plate defining
a central opening
aligned with said
elongated member
opening, said bearing
plate including a
central portion which
defines the central
opening and two spaced
apart legs positioned
on and secured to
opposite sides of said
central portion and two
rib receiving openings
defined by portions of
said legs and sides
positioned on opposite
ends of said central
portion, whereby
respective portions of
said central rib
positioned on opposite
sides of said elongated
member opening are
received within the rib
receiving openings; and
an anchor
extending through said
aligned openings into
the rock formation and
bearing against said
bearing plate central
portion for urging said
bearing plate into
compressive engagement
with said elongated
member to reinforce

1
said elongated member
compressed against the
rock formation to
support the rock
formation.

22. The apparatus
for supporting a rock
formation as claimed in
claim 21, wherein said
bearing plate central
portion is attached to
said legs through an
embossed portion.

23. The apparatus
for supporting a rock
formation as claimed in
claim 21, wherein said
elongated member
extends along a
longitudinal axis and
said central rib
extends along the
longitudinal axis, each
of said legs of said
bearing plate
longitudinally extends
from a first end to a
second end, whereby
said elongated member
opening is positioned
between said legs and
said first end and said
second end of each
respective leg
longitudinally extends

I

beyond the elongated
member opening.

24. A method for
supporting a rock
formation, comprising
the steps of:

positioning an
elongated channel
member in contact with
a planar surface of a
rock formation;

reinforcing the
channel member with a
longitudinal embossment
extending the length of
the channel member;

positioning an
opening in the channel
member;

positioning a
bearing plate having a
contact surface in
overlying relation with
the channel member
around the opening
therethrough;

s t r a d d l i n g
portions of the
longitudinal embossment
by leg portions of the
bearing plate;

positioning a
central portion of the
bearing plate within
the opening of the
channel member so that

I

an opening in the bearing plate is aligned with the opening of the channel member;

restraining longitudinal movement of the bearing plate on the channel member; and

extending an anchor bolt through the aligned openings in the bearing plate and the channel member into engagement with the rock formation to compress the bearing plate against the channel member to maintain the channel member in bearing contact with the surface of the rock formation.